CLAIMS

The embodiments of the invention in which an exclusive property or right is claimed are defined as follows. Having thus described the invention what is claimed is:

1. A vapor sensing system, comprising:

an active sensor that generates an active signal and an error sensor that generates an error signal; and

wherein said active sensor and said error sensor together comprise a vapor sensor, wherein said error signal is subtracted from said active signal to generate a compensated signal indicative of the presence of an ignitable vapor.

2. The system of claim 1 further comprising:

an amplifier associated with said vapor sensor, wherein said amplifier subtracts said error signal from said active signal to generate said compensated signal, which is indicative of the presence of said ignitable vapor within a vicinity of an appliance associated with said vapor sensor;

an output signal conditioning circuit which receives said compensated signal from said amplifier and generates a conditioned signal thereof for transmission to a microprocessor; and

a microprocessor for instructing said controller to shut down said appliance in response to an input of said conditioned signal to said microprocessor from said amplifier.

3. The system of claim 2 wherein said appliance comprises a fuel-fired

appliance.

4. The vapor sensor of claim 1 wherein said vapor sensor comprises a fluid flow sensor.

5. The system of claim 1 wherein said vapor sensor comprises a thermal conductivity sensor, which measures an amount of power required to maintain a self-heated resistor thereof at a specific temperatures above an ambient temperature thereof.

6. The system of 1 wherein said vapor sensor comprises a thermal conductivity sensor, which measures a temperature change at a constant power required of a self-heated resistor thereof.

7. The system of 1 wherein said vapor sensor comprises a thermal conductivity sensor, which measures a temperature change at a constant power required of a self-heated resistor thereof.

8. The system of claim 2 wherein said active sensor is exposed to a total atmospheric environment, including ignitable vapors generated by said appliance, and wherein said error sensor is exposed to a said total atmospheric environment, excluding said ignitable vapors generated by said appliance.

9. The system of claim 1 wherein said active sensor is surrounded by a membrane that is permeable to all vapors, except vapors impermeable to airflow, liquids and dust.

10. The system of claim 1 wherein said error sensor is surrounded by a membrane which selectively passes air and humidity, excluding ignitable gasoline vapors, to said error sensor, while protecting said error sensor from airflow, liquids, and dust.

11. A vapor sensing system, comprising:

a fuel-fired appliance associated with a controller for controlling said fuel-fired appliance;

a vapor sensor associated with said fuel-fired appliance, wherein said vapor sensor comprises an active sensor and an error sensor, wherein said active sensor generates an active signal and said error sensor generates an error signal;

an amplifier associated with said vapor sensor, wherein said amplifier subtracts said error signal from said active signal to generate a compensated signal indicative of the presence of an ignitable vapor within a vicinity of said fuel-fired appliance and thereby instruct said controller to shut down said fuel-fired appliance;

an output signal conditioning circuit which receives said compensated signal from said amplifier and generates a conditioned signal thereof for transmission to a microprocessor; and

a microprocessor for instructing said controller to shut down said fuel-fired appliance in response to an input of said conditioned signal to said microprocessor from said amplifier.

12. A vapor sensing method, comprising the steps of:

providing an active sensor that generates an active signal; and

providing an error sensor that generates an error signal, wherein said active sensor and said error sensor together comprise a vapor sensor, wherein said error signal is subtracted from said active signal to generate a

compensated signal indicative of the presence of an ignitable vapor.

13. The method of claim 12 further comprising the steps of:

associating an amplifier with said vapor sensor, wherein said amplifier subtracts said error signal from said active signal to generate said compensated signal, which is indicative of the presence of said ignitable vapor within a vicinity of an appliance associated with said vapor sensor;

providing an output signal conditioning circuit which receives said compensated signal from said amplifier and generates a conditioned signal thereof for transmission to a microprocessor; and

providing a microprocessor for instructing said controller to shut down said appliance in response to an input of said conditioned signal to said microprocessor from said amplifier.

14. The method of claim 13 wherein said appliance comprises a fuel-fired appliance.

15. The method of claim 12 wherein said vapor sensor comprises a fluid flow sensor.

16. The method of claim 12 wherein said vapor sensor comprises a thermal conductivity sensor, which measures an amount of power required to maintain a self-heated resistor thereof at a specific temperatures above an ambient temperature thereof.

17. The method of 12 wherein said vapor sensor comprises a thermal conductivity sensor, which measures a temperature change at a constant power required of a self-heated resistor thereof.

18. The method of 12 wherein said vapor sensor comprises a thermal conductivity sensor, which measures a temperature change at a constant power required of a self-heated resistor thereof.

19. The method of claim 13 further comprising the steps of:

exposing said active sensor to a total atmospheric environment, including ignitable vapors generated by said appliance; and

exposing said error sensor to a said total atmospheric environment, excluding said ignitable vapors generated by said appliance.

20. The method of claim 12 further comprising the step of surrounding said active sensor by a membrane that is permeable to all vapors, except vapors impermeable to airflow, liquids and dust.